



SEQUENCE LISTING

<110> MARKS, JAMES D.  
AMERSDORFER, PETER

<120> THERAPEUTIC MONOCLONAL ANTIBODIES THAT NEUTRALIZE BOTULINUM  
NEUROTOXINS

<130> 407T-895120US

<140> US 10/632,706

<141> 2003-08-01

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<151> 2002-08-01

<150> US 09/144,806

<151> 1998-08-31

<160> 278

<170> PatentIn version 3.2

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<400> 48

Gln Val Lys Leu Gln Gln Ser Gly Ala Glu Leu Val Arg Pro Gly Ala  
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Ser Val Lys Leu Ser Cys Lys Thr Ser Gly Tyr Ser Phe Thr Ser Tyr  
20 25 30

Trp Met Asn Trp Val Lys Gln Gly Pro Gly Gln Gly Leu Glu Trp Ile  
35 40 45

Gly Met Ile His Pro Ser Asn Ser Glu Ile Arg Phe Asn Gln Lys Phe  
50 55 60

Glu Asp Met Ala Thr Leu Thr Val Asp Lys Ser Ser Ser Thr Ala Tyr  
65 70 75 80

Met Gln Leu Ser Ser Pro Thr Ser Glu Asp Ser Ala Val Tyr Tyr Cys  
85 90 95

Ala Arg Gly Ile Tyr Tyr Asp Tyr Asp Gly Gly Asn Tyr Tyr Ala Met  
100 105 110

Asp Tyr Trp Gly Gln Gly Thr Thr Val Thr Ala Ser Ser  
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<210> 49  
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<212> PRT  
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Gln Val Lys Leu Gln Gln Ser Gly Ala Glu Leu Val Arg Pro Gly Ala  
1 5 10 15

Ser Val Lys Leu Ser Cys Lys Thr Ser Gly Tyr Ser Phe Thr Ser Tyr  
20 25 30

Trp Met Asn Trp Val Lys Gln Gly Pro Gly Gln Gly Leu Glu Trp Ile  
35 40 45

Gly Met Ile His Pro Ser Asn Ser Glu Ile Arg Phe Asn Gln Lys Phe  
50 55 60

Glu Asn Met Ala Thr Leu Thr Val Asp Lys Ser Ser Ser Thr Ala Tyr  
65 70 75 80

Met Gln Leu Ser Ser Pro Thr Ser Glu Asp Ser Ala Val Tyr Tyr Cys  
85 90 95

Ala Arg Gly Ile Tyr Tyr Val Tyr Asp Gly Gly Asn Thr Thr Ala Met  
100 105 110

Asp Tyr Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser  
115 120 125

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<400> 50

Glu Val Lys Leu Val Glu Ser Gly Ala Glu Leu Val Arg Pro Gly Ala  
1 5 10 15

Ser Val Asn Leu Ser Cys Lys Ala Ser Gly Tyr Ser Phe Thr Ser Tyr  
20 25 30

Trp Met Asn Trp Val Lys Gln Arg Pro Gly Gln Gly Leu Glu Trp Ile  
35 40 45

Gly Met Ile His Pro Ser Asn Ser Glu Thr Arg Leu Asn Gln Lys Phe  
50 55 60

Lys Asp Lys Ala Thr Leu Thr Val Asp Lys Ser Ser Ser Thr Ala Tyr  
65 70 75 80

Met Gln Leu Ser Ser Pro Thr Ser Glu Asp Ser Ala Val Tyr Tyr Cys  
85 90 95

Ala Arg Gly Ile Tyr Tyr Asp Tyr Asp Glu Gly Tyr Tyr Tyr Thr Leu  
100 105 110

Asp Tyr Trp Gly Gln Gly Thr Thr Leu Thr Val Ser Ser  
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Gln Val Lys Leu Gln Gln Ser Gly Ala Glu Leu Val Arg Pro Gly Ala  
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Ser Val Lys Leu Ser Cys Lys Ala Ser Gly Tyr Ser Phe Thr Ser Tyr  
20 25 30

Trp Met Asn Trp Val Lys Gln Arg Pro Gly Gln Gly Leu Glu Trp Ile  
35 40 45

Gly Met Ile His Pro Ser Asn Ser Asp Thr Arg Phe Asn Gln Lys Phe  
 50 55 60

Glu Asp Lys Ala Thr Leu Thr Val Asp Arg Ser Ser Ser Thr Ala Ile  
 65 70 75 80

His Gln Leu Ser Ser Pro Thr Ser Glu Asp Ser Ala Val Tyr Tyr Cys  
 85 90 95

Ala Arg Gly Leu Tyr Gly Tyr Gly Phe Trp Tyr Phe Asp Val Trp Gly  
 100 105 110

Gln Gly Thr Thr Val Thr Val Ser Ser  
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<400> .52

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 1 5 10 15

Ser Val Lys Leu Ser Cys Lys Ala Ser Gly Tyr Ser Leu Thr Ser Tyr  
 20 25 30

Trp Met Asn Trp Val Lys Gln Arg Pro Gly Gln Gly Leu Glu Trp Ile  
 35 40 45

Gly Met Ile His Pro Ser Asp Ser Asp Thr Arg Phe Asn Gln Lys Phe  
 50 55 60

Glu Asp Lys Ala Thr Leu Thr Val Asp Thr Ser Ser Ser Thr Ala Tyr  
 65 70 75 80

Met Gln Leu Ser Ser Pro Thr Ser Glu Asp Ser Ala Val Tyr Tyr Cys  
 85 90 95

Ala Arg Gly Leu Tyr Asn Gly Phe Trp Tyr Phe Asp Val Trp Gly Gln  
 100 105 110

Gly Thr Thr Val Thr Val Ser Ser  
115 120

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<220>  
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<400> 53

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Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Thr Phe Ile Asp Tyr  
20 25 30

Ala Met His Trp Val Lys Gln Ser Pro Ala Lys Ser Leu Glu Trp Ile  
35 40 45

Gly Val Ile Ser Ser Tyr Tyr Gly Asp Thr Asp Tyr Asn Gln Ile Phe  
50 55 60

Lys Gly Lys Ala Thr Leu Thr Val Asp Lys Ser Ser Asn Thr Ala Tyr  
65 70 75 80

Met Glu Leu Ala Arg Leu Thr Ser Asp Asp Ser Ala Ile Tyr Tyr Cys  
85 90 95

Ala Arg Arg Gly Lys Gly Ala Met Asp Tyr Trp Gly Gln Gly Thr Thr  
100 105 110

Val Thr Val Ser Ser  
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Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Thr Phe Ile Asp Tyr  
20 25 30

Ala Val His Trp Val Lys Gln Ser His Ala Lys Ser Leu Glu Trp Ile  
35 40 45

Gly Val Ile Ser Thr Tyr Tyr Gly Asp Ala Asp Tyr Asn Pro Lys Phe  
50 55 60

Lys Gly Lys Ala Thr Leu Thr Val Asn Lys Ser Ser Asn Thr Ala Tyr  
65 70 75 80

Met Glu Leu Pro Arg Leu Thr Ser Glu Asp Ser Ala Ile Tyr Tyr Cys  
85 90 95

Ala Arg Arg Gly Lys Gly Ala Met Asp Tyr Trp Gly Gln Gly Thr Ser  
100 105 110

Val Thr Val Ser Ser  
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Glu Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Gln  
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Ser Leu Ser Leu Thr Cys Thr Val Thr Gly Tyr Ser Ile Thr Asp Tyr  
20 25 30

Ala Trp Asn Trp Ile Arg Gln Phe Pro Gly Lys Lys Leu Glu Trp Met  
35 40 45

Gly Tyr Ile Ser Tyr Ser Gly Ser Thr Gly Tyr Asn Pro Ser Leu Lys  
50 55 60



Ser Arg Ile Ser Ile Thr Arg Asp Thr Ser Lys Asn Gln Phe Phe Leu  
65 70 75 80

Gln Leu Asn Ser Val Thr Thr Glu Asp Thr Gly Thr Tyr Tyr Cys Ala  
85 90 95

Arg Gly Tyr Asp Ala Met Asp Tyr Trp Gly Gln Gly Thr Ser Val Thr  
100 105 110

Val Ser Ser  
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<400> 56

Glu Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Gln  
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Ser Leu Ser Leu Thr Cys Thr Val Thr Gly Tyr Ser Ile Thr Asp Tyr  
20 25 30

Ala Trp Tyr Trp Ile Arg Gln Phe Pro Gly Lys Lys Leu Glu Trp Met  
35 40 45

Gly Tyr Ile Ser Tyr Ser Gly Ser Thr Gly Tyr Asn Pro Ser Leu Lys  
50 55 60

Ser Arg Ile Ser Ile Thr Arg Asp Thr Ser Lys Asn Gln Phe Phe Leu  
65 70 75 80

Gln Leu Asn Ser Val Thr Thr Glu Asp Thr Gly Thr Tyr Tyr Cys Ala  
85 90 95

Arg Gly Tyr Asp Ala Met Asp Tyr Trp Gly Gln Gly Thr Ser Val Thr  
100 105 110

Val Ser Ser  
115

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<400> 57

Glu Val Lys Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly  
1 5 10 15

Ser Arg Lys Leu Ser Cys Ala Thr Ser Gly Phe Thr Phe Ser Asp Tyr  
20 25 30

Tyr Met Ser Trp Ile Arg Gln Ser Pro Asp Lys Arg Leu Glu Trp Val  
35 40 45

Ala Thr Ile Ser Asp Gly Gly Thr Tyr Thr Tyr Tyr Pro Asp Ser Val  
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Thr Leu Tyr  
65 70 75 80

Leu Gln Met Ser Ser Leu Lys Ser Glu Asp Thr Ala Met Tyr Tyr Cys  
85 90 95

Val Arg His Gly Tyr Gly Asn Tyr Pro Ser His Trp Tyr Phe Asp Val  
100 105 110

Trp Gly Ala Gly Thr Thr Val Thr Val Ser Ser  
115 120

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<400> 58

Glu Val Lys Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly  
1 5 10 15

Ser Leu Lys Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asn Tyr  
 20 25 30

Gly Met Ser Trp Val Arg Gln Thr Pro Asp Lys Arg Leu Glu Trp Val  
 35 40 45

Ala Met Ile Ser Ser Gly Gly Ser Tyr Asn Tyr Tyr Ser Asp Ser Val  
 50 55 60

Lys Gly Arg Val Thr Ile Ser Arg Asp Asn Ala Lys Ser Thr Leu Tyr  
 65 70 75 80

Leu Gln Met Ser Ser Leu Gln Ser Glu Asp Thr Ala Met Tyr Leu Cys  
 85 90 95

Thr Arg His Gly Tyr Gly Asn Tyr Pro Ser Tyr Trp Tyr Phe Asp Val  
 100 105 110

Trp Gly Ala Gly Thr Thr Val Thr Val Ser Ser  
 115 120

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<400> 59

Gln Val Gln Leu Gln Glu Ser Gly Gly Gly Ser Val Lys Pro Gly Gly  
 1 5 10 15

Ser Leu Lys Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asp Tyr  
 20 25 30

Tyr Met Ser Trp Val Arg Gln Thr Pro Glu Lys Arg Leu Glu Trp Val  
 35 40 45

Ala Thr Ile Ser Asp Gly Gly Ser Tyr Thr Tyr Tyr Pro Asp Ser Val  
 50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Asn Leu Tyr  
 65 70 75 80

Leu Gln Met Ser Ser Leu Lys Ser Glu Asp Thr Ala Ile Tyr Tyr Cys  
85 90 95

Val Arg Tyr Arg Tyr Asp Glu Gly Leu Asp Tyr Trp Gly Gln Gly Thr  
100 105 110

Thr Val Thr Val Ser Ser  
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<212> PRT

<213> Artificial

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<400> 60

Gln Val Gln Leu Gln Glu Ser Gly Gly Gly Leu Val Lys Pro Gly Gly  
1 5 10 15

Ser Leu Lys Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asp Tyr  
20 25 30

Tyr Met Tyr Trp Val Arg Gln Thr Pro Glu Lys Arg Leu Glu Trp Val  
35 40 45

Ala Thr Ile Ser Asp Gly Gly Ser Tyr Thr Tyr Tyr Pro Asp Ser Val  
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Asn Leu Tyr  
65 70 75 80

Leu Gln Met Ser Ser Leu Lys Ser Glu Asp Thr Ala Met Tyr Tyr Cys  
85 90 95

Ser Arg Tyr Arg Tyr Asp Asp Ala Met Asp Tyr Trp Gly Gln Gly Thr  
100 105 110

Thr Val Thr Val Ser Ser  
115

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<211> 118  
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<220>  
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<400> 61

Glu Val Lys Leu Val Glu Ser Gly Gly Gly Leu Val Lys Pro Gly Gly  
1 5 10 15

Ser Leu Lys Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr  
20 25 30

Ala Met Ser Trp Val Arg Gln Thr Pro Glu Lys Arg Leu Glu Trp Val  
35 40 45

Ala Thr Ile Ser Asp Gly Gly Thr Tyr Thr Tyr Tyr Thr Asp Asn Val  
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys His Asn Leu Tyr  
65 70 75 80

Leu Gln Met Ser His Leu Lys Ser Glu Asp Thr Ala Met Tyr Tyr Cys  
85 90 95

Ala Arg Asn Leu Pro Tyr Asp His Val Asp Tyr Trp Gly Gln Gly Thr  
100 105 110

Ser Val Thr Val Ser Ser  
115

<210> 62  
<211> 118  
<212> PRT  
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<220>  
<223> single chain antibody

<400> 62

Glu Val Lys Leu Lys Glu Ser Gly Gly Gly Leu Val Lys Pro Gly Gly  
1 5 10 15

Ser Leu Lys Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr  
20 25 30

Ala Met Ser Trp Val Arg Gln Thr Pro Glu Lys Arg Leu Glu Trp Val  
35 40 45

Ala Thr Ile Ser Asp Gly Gly Thr Tyr Thr Tyr Thr Asp Asn Val  
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys His Asn Leu Tyr  
65 70 75 80

Leu Gln Met Ser His Leu Lys Ser Glu Asp Thr Ala Met Tyr Tyr Cys  
85 90 95

Ala Arg Asn Leu Pro Tyr Asp His Val Asp Tyr Trp Gly Gln Gly Thr  
100 105 110

Ser Val Thr Val Ser Ser  
115

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<220>  
<223> single chain antibody

<400> 63

His Gly Lys Leu Val Glu Ser Gly Gly Gly Leu Val Lys Pro Gly Gly  
1 5 10 15

Ser Leu Lys Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr  
20 25 30

Ala Met Ser Trp Val Arg Gln Thr Pro Glu His Arg Leu Glu Trp Val  
35 40 45

Ala Thr Ile Ser Asp Gly Gly Thr Phe Thr Tyr Tyr Thr Asp Asn Val  
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys His Asn Leu Tyr  
65 70 75 80

Leu Gln Met Ser His Leu Lys Ser Glu Asp Thr Ala Met Tyr Tyr Cys

85

90

95

Ala Arg Asn Leu Pro Tyr Asp His Val Asp Tyr Trp Gly Gln Gly Thr  
 100 105 110

Ser Val Thr Val Ser Ser  
 115

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<220>  
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<400> 64

Glu Val Lys Leu Val Glu Ser Gly Gly Gly Leu Val Lys Pro Gly Gly  
 1 5 10 15

Pro Leu Lys Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr  
 20 25 30

Ala Met Ser Trp Val Arg Gln Thr Pro Glu His Arg Leu Glu Trp Val  
 35 40 45

Ala Thr Ile Ser Asp Gly Gly Thr Phe Thr Tyr Tyr Thr Asp Asn Val  
 50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys His Asn Leu Tyr  
 65 70 75 80

Leu Gln Met Ser His Leu Lys Ser Glu Asp Thr Ala Met Tyr Tyr Cys  
 85 90 95

Ala Arg Asn Leu Pro Tyr Asp His Val Asp Tyr Trp Gly Gln Gly Thr  
 100 105 110

Ser Val Thr Val Ser Ser  
 115

<210> 65  
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 <212> PRT  
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<220>

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<400> 65

Glu Val Gln Leu Gln Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg  
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr  
20 25 30

Ala Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val  
35 40 45

Ala Val Ile Ser Tyr Asp Gly Ser Asn Lys Tyr Tyr Ala Asp Ser Val  
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr  
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys  
85 90 95

Ala Arg Asp Trp Ser Glu Gly Tyr Tyr Tyr Tyr Gly Met Asp Val Trp  
100 105 110

Gly Gln Gly Thr Thr Val Ile Val Ser Ser  
115 120

<210> 66

<211> 122

<212> PRT

<213> Artificial

<220>

<223> single chain antibody

<400> 66

Gln Ile Gln Leu Leu Gln Ser Gly Gly Gly Val Val Gln Pro Gly Arg  
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr  
20 25 30

Ala Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val



35

40

45

Ala Val Ile Ser Tyr Asp Gly Ser Asn Lys Tyr Tyr Ala Asp Ser Val  
 50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr  
 65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys  
 85 90 95

Ala Arg Asp Trp Ser Glu Gly Tyr Tyr Tyr Tyr Gly Met Asp Val Trp  
 100 105 110

Gly Gln Gly Thr Thr Val Ile Val Ser Ser  
 115 120

<210> 67

<211> 121

<212> PRT

<213> Artificial

<220>

<223> single chain antibody

<400> 67

Val Lys Leu Val Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Gln Ser  
 1 5 10 15

Leu Ser Leu Thr Cys Thr Val Thr Gly Tyr Ser Ile Thr Ser Asp Tyr  
 20 25 30

Ala Trp Asn Trp Ile Arg Gln Phe Pro Gly Asn Lys Leu Glu Trp Met  
 35 40 45

Gly Tyr Ile Asn Tyr Asp Gly Ser Asn Asn Tyr Asn Pro Ser Leu Lys  
 50 55 60

Asn Arg Ile Ser Ile Thr Arg Asp Thr Ser Lys Asn Gln Phe Phe Leu  
 65 70 75 80

Lys Leu Asn Ser Val Thr Ser Glu Asp Thr Ala Thr Tyr Tyr Cys Ala  
 85 90 95

Arg Ala Gly Asp Gly Tyr Tyr Val Asp Trp Tyr Phe Asp Val Trp Gly  
100 105 110

Thr Gly Thr Thr Val Ile Val Ser Ser  
115 120

<210> 68  
<211> 117  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody

<400> 68

Gln Val Gln Leu Gln Gln Ser Gly Ala Glu Leu Val Gln Pro Gly Ala  
1 5 10 15

Ser Val Lys Met Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asp Tyr  
20 25 30

Trp Thr Thr Trp Val Lys Gln Arg Pro Gly Gln Gly Leu Glu Trp Ile  
35 40 45

Gly Asp Ile Tyr Pro Gly Ser Gly Ser Thr Asn Tyr Asn Glu Lys Phe  
50 55 60

Lys Ser Lys Ala Thr Leu Thr Val Asp Thr Ser Ser Ser Thr Ala Tyr  
65 70 75 80

Met Gln Leu Ser Ser Leu Thr Ser Glu Asp Ser Ala Val Tyr Tyr Cys  
85 90 95

Ala Arg Glu Leu Gly Asp Ala Met Asp Tyr Trp Gly Gln Gly Thr Ser  
100 105 110

Val Ile Val Ser Ser  
115

<210> 69  
<211> 117  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody

<400> 69

Glu Val Gln Leu Gln Gln Ser Gly Ala Glu Leu Val Gln Pro Gly Ala  
1 5 10 15

Ser Val Lys Met Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asp Tyr  
20 25 30

Trp Thr Thr Trp Val Lys Gln Arg Pro Gly Gln Gly Leu Glu Trp Ile  
35 40 45

Gly Asp Ile Tyr Pro Asp Ser Gly Ser Thr Asn Tyr Asn Glu Lys Phe  
50 55 60

Lys Ser Lys Ala Thr Leu Thr Val Asp Thr Ser Ser Ser Thr Ala Tyr  
65 70 75 80

Met Gln Leu Ser Ser Leu Thr Ser Glu Asp Ser Ala Val Tyr Tyr Cys  
85 90 95

Ala Arg Glu Leu Gly Asp Ala Met Asp Tyr Trp Gly Gln Gly Thr Ser  
100 105 110

Val Ile Val Ser Ser  
115

<210> 70

<211> 119

<212> PRT

<213> Artificial

<220>

<223> single chain antibody

<400> 70

Glu Val Gln Leu Gln Gln Ser Gly Ala Glu Leu Val Lys Pro Gly Ala  
1 5 10 15

Ser Val Lys Leu Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Ser Phe  
20 25 30

Trp Met His Trp Val Lys Gln Arg Pro Gly Arg Gly Leu Glu Trp Ile  
35 40 45

Gly Arg Leu Asp Pro Asn Ser Gly Glu Thr Lys Tyr Asn Glu Lys Phe  
50 55 60

Lys Ser Lys Ala Thr Leu Thr Val Asp Lys Pro Ser Ser Thr Ala Tyr  
65 70 75 80

Met Glu Leu Ser Ser Leu Thr Ser Glu Asp Ser Ala Val Tyr Tyr Cys  
85 90 95

Ala Arg Glu Ala Tyr Gly Tyr Trp Asn Phe Asp Val Trp Gly Thr Gly  
100 105 110

Thr Thr Val Thr Val Ser Ser  
115

<210> 71  
<211> 119  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody

<400> 71

Glu Val Gln Leu Gln Gln Ser Gly Ala Glu Leu Val Lys Pro Gly Ala  
1 5 10 15

Ser Val Lys Leu Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Ser Phe  
20 25 30

Trp Met His Trp Val Lys Gln Arg Pro Gly Arg Gly Leu Glu Trp Ile  
35 40 45

Gly Arg Leu Asp Pro Asn Ser Gly Glu Thr Lys Tyr Asn Lys Lys Phe  
50 55 60

Lys Ser Lys Ala Thr Leu Thr Val Asp Lys Pro Ser Ser Thr Ala Tyr  
65 70 75 80

Met Glu Leu Ser Ser Leu Thr Ser Glu Asp Ser Ala Val Tyr Tyr Cys  
85 90 95

Ala Arg Glu Ala Tyr Gly Tyr Trp Asn Phe Asp Val Trp Gly Thr Gly  
100 105 110

Thr Thr Val Thr Val Ser Ser  
115

<210> 72  
<211> 107  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody

<400> 72

Asp Ile Glu Leu Thr Gln Ser Pro Ala Ile Met Ser Ala Ser Pro Gly  
1 5 10 15

Glu Lys Val Ile Met Thr Cys Ser Ala Ser Ser Ser Val Ser His Met  
20 25 30

Tyr Trp Tyr Gln Gln Lys Pro Gly Ser Ser Pro Arg Leu Leu Ile Tyr  
35 40 45

Asp Thr Ser Asn Leu Ala Ser Gln Val Pro Ile Arg Phe Ser Gly Ser  
50 55 60

Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile Ser Arg Met Glu Ala Glu  
65 70 75 80

Asp Ser Ala Thr Tyr Tyr Cys Gln Gln Trp Ser Ser Tyr Pro Phe Thr  
85 90 95

Phe Gly Ser Gly Thr Lys Leu Glu Leu Lys Arg  
100 105

<210> 73  
<211> 107  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody

<400> 73

Asp Ile Asp Leu Thr Gln Ser Pro Ala Ile Met Ser Ser Ser Pro Gly  
1 5 10 15

Glu Lys Val Ile Ile Thr Cys Ser Ala Ser Ser Ser Val Ser Tyr Met  
20 25 30

His Trp Phe Gln Gln Lys Pro Gly Thr Ser Pro Lys Pro Trp Ile Tyr  
35 40 45

Ser Thr Ser Asn Leu Ala Ser Gln Val Pro Ala Arg Phe Ser Gly Ser  
50 55 60

Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile Ser Ser Val Glu Ala Glu  
65 70 75 80

Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Tyr Ser Gly Tyr Pro Leu Thr  
85 90 95

Phe Gly Ala Gly Thr Lys Leu Glu Ile Lys Arg  
100 105

<210> 74  
<211> 109  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody

<400> 74

Asp Ile Glu Leu Thr Gln Ser Pro Ala Ile Met Ala Ala Ser Pro Gly  
1 5 10 15

Glu Lys Val Ile Ile Thr Cys Ser Ala Ser Ser Ser Ile Ser Ser Ser  
20 25 30

Asn Leu His Trp Tyr Gln Gln Lys Ser Glu Thr Ser Pro Lys Pro Trp  
35 40 45

Ile Tyr Gly Thr Ser Asn Leu Ala Ser Gln Val Pro Val Arg Phe Ser  
50 55 60

Gly Ser Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile Ser Ser Met Glu  
65 70 75 80

Ala Glu Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Trp Gly Ser Tyr Pro  
85 90 95

Leu Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys Arg  
100 105

<210> 75  
<211> 107  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody

<400> 75

Asp Ile Glu Leu Thr Gln Ser Pro Ala Ile Met Ser Ala Ser Pro Gly  
1 5 10 15

Glu Lys Val Ile Met Thr Cys Ser Ala Ser Ser Ser Val Ser Tyr Met  
20 25 30

Tyr Trp Tyr Gln Gln Lys Pro Gly Ser Ser Pro Arg Leu Leu Ile Tyr  
35 40 45

Asp Thr Ser Asn Leu Ala Ser Gln Val Pro Val Arg Phe Ser Gly Ser  
50 55 60

Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile Ser Arg Met Glu Ala Glu  
65 70 75 80

Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Trp Ser Ser Tyr Pro Leu Thr  
85 90 95

Phe Gly Ala Gly Thr Lys Leu Glu Leu Lys Arg  
100 105

<210> 76  
<211> 109  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody

<400> 76

Asp Ile Glu Leu Thr Gln Ser Pro Ala Leu Met Ala Ala Ser Pro Gly  
1 5 10 15

Glu Lys Val Ile Ile Thr Cys Ser Val Ser Ser Ser Ile Ser Ser Ser  
20 25 30

Asn Leu His Trp Tyr Gln Gln Lys Ser Gly Thr Ser Pro Lys Pro Trp  
35 40 45

Ile Tyr Gly Thr Ser Asn Leu Ala Ser Gln Val Pro Val Arg Phe Ser  
50 55 60

Gly Ser Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile Ser Ser Met Glu  
65 70 75 80

Ala Glu Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Trp Ser Ser Tyr Pro  
85 90 95

Leu Thr Phe Gly Ala Gly Thr Lys Leu Glu Ile Lys Arg  
100 105

<210> 77  
<211> 112  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody

<400> 77

Asp Ile Glu Leu Thr Gln Ser Pro Ala Ser Leu Ala Val Ser Leu Gly  
1 5 10 15

Gln Arg Ala Ile Ile Ser Cys Arg Ala Tyr Glu Ser Val Asp Ser Tyr  
20 25 30

Gly Asn Ser Phe Met His Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro  
35 40 45

Lys Leu Leu Ile Tyr Arg Ala Ser Asn Leu Glu Ser Gln Ile Pro Ala  
50 55 60

Arg Phe Ser Gly Ser Gly Ser Arg Thr Asp Phe Thr Leu Thr Ile Asn  
65 70 75 80

Pro Val Glu Ala Asp Asp Val Ala Thr Tyr Tyr Cys Gln Gln Ser Asn  
85 90 95



Glu Asp Pro Pro Thr Phe Gly Ala Gly Thr Lys Leu Glu Leu Lys Arg  
100 105 110

<210> 78  
<211> 112  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody

<400> 78

Asp Ile Glu Leu Thr Gln Ser Pro Ala Ser Leu Ala Val Ser Leu Gly  
1 5 10 15

Gln Arg Ala Ile Ile Ser Cys Arg Ala Tyr Glu Ser Val Asp Ser Tyr  
20 25 30

Gly Asn Ser Phe Met His Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro  
35 40 45

Lys Leu Leu Ile Tyr Arg Ala Ser Asn Leu Glu Ser Gln Ile Pro Ala  
50 55 60

Arg Phe Ser Gly Ser Gly Ser Arg Thr Asp Phe Thr Leu Thr Ile Asn  
65 70 75 80

Pro Val Glu Ala Asp Asp Val Ala Thr Tyr Tyr Cys Gln Gln Ser Asn  
85 90 95

Glu Asp Pro Tyr Thr Phe Gly Ala Gly Thr Lys Leu Glu Ile Lys Arg  
100 105 110

<210> 79  
<211> 107  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody

<400> 79

Asp Ile Glu Leu Thr Gln Ser Pro Ala Ile Met Ser Ala Ser Pro Gly  
1 5 10 15

Glu Lys Val Ile Met Thr Cys Ser Ala Ser Ser Ser Val Ser Tyr Met  
20 25 30

His Trp Tyr Gln Gln Lys Ser Gly Thr Ser Pro Lys Arg Trp Ile Tyr  
35 40 45

Asp Thr Ser Lys Leu Ala Ser Gln Val Pro Ala Arg Phe Ser Gly Ser  
50 55 60

Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile Ser Ser Met Glu Ala Glu  
65 70 75 80

Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Trp Ser Ser Asn Pro Leu Thr  
85 90 95

Phe Gly Ala Gly Thr Lys Leu Glu Leu Lys Arg  
100 105

<210> 80  
<211> 107  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody

<400> 80

Asp Ile Glu Leu Thr Gln Ser Pro Ala Ile Met Ser Ala Ser Pro Gly  
1 5 10 15

Glu Lys Val Ile Met Thr Cys Ser Ala Ser Ser Ser Val Ser Tyr Met  
20 25 30

His Trp Tyr Gln Gln Lys Ser Gly Thr Ser Pro Lys Arg Trp Ile Tyr  
35 40 45

Asp Thr Ser Lys Leu Ala Ser Gln Val Pro Ala Arg Phe Ser Gly Ser  
50 55 60

Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile Ser Ser Met Glu Ala Glu  
65 70 75 80

Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Trp Ser Ser Asn Pro Leu Thr  
85 90 95

Phe Gly Ala Gly Thr Lys Leu Glu Leu Lys Arg  
100 105

<210> 81  
<211> 112  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody

<400> 81

Asp Ile Glu Leu Thr Gln Ser Pro Ala Ser Leu Ala Val Ser Leu Gly  
1 5 10 15

Gln Arg Ala Thr Ile Ser Cys Arg Ala Ser Glu Ser Val Asp Ser Tyr  
20 25 30

Gly Asn Ser Phe Met Gly Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro  
35 40 45

Lys Leu Leu Ile Tyr Leu Ala Ser Asn Leu Glu Ser Gly Val Pro Ala  
50 55 60

Arg Phe Ser Gly Ser Gly Ser Arg Thr Asp Phe Thr Leu Thr Ile Asp  
65 70 75 80

Pro Val Glu Ala Asp Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Trp Ser  
85 90 95

Ser Tyr Pro Phe Thr Phe Gly Ser Gly Thr Lys Leu Glu Leu Lys Arg  
100 105 110

<210> 82  
<211> 112  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody

<400> 82

Asp Ile Glu Leu Thr Gln Ser Pro Thr Ser Leu Ala Val Ser Leu Gly  
1 5 10 15

Gln Arg Ala Thr Ile Ser Cys Arg Ala Ser Glu Ser Val Asp Ser Tyr  
 20 25 30

Gly Asn Ser Phe Met His Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro  
 35 40 45

Lys Leu Leu Ile Tyr Leu Ala Ser Asn Leu Glu Ser Gly Val Pro Ala  
 50 55 60

Arg Phe Ser Gly Ser Gly Ser Arg Thr Asp Phe Thr Leu Thr Ile Asp  
 65 70 75 80

Pro Val Glu Ala Asp Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Tyr Ser  
 85 90 95

Gly Tyr Pro Leu Thr Phe Gly Ser Gly Thr Lys Leu Glu Leu Lys Arg  
 100 105 110

<210> 83  
 <211> 112  
 <212> PRT  
 <213> Artificial

<220>  
 <223> single chain antibody

<400> 83

Asp Ile Glu Leu Thr Gln Ser Pro Ala Ser Leu Ala Val Ser Leu Gly  
 1 5 10 15

Arg Arg Ala Thr Ile Ser Cys Arg Ala Ser Glu Ser Val Asp Ser Tyr  
 20 25 30

Gly His Ser Phe Met His Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro  
 35 40 45

Lys Leu Leu Ile Tyr Leu Ala Ser Asn Leu Glu Ser Gly Val Pro Ala  
 50 55 60

Arg Phe Ser Gly Ser Gly Ser Arg Thr Asp Phe Thr Leu Thr Ile Asp  
 65 70 75 80

Pro Val Glu Ala Asp Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Trp Ser  
 85 90 95

Ser Tyr Pro Leu Thr Phe Gly Ser Gly Thr Lys Leu Glu Leu Lys Arg  
100 105 110

<210> 84  
<211> 112  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody

<400> 84

Asp Ile Glu Leu Thr Gln Ser Pro Ala Ser Leu Ala Val Ser Leu Gly  
1 5 10 15

Gln Arg Ala Thr Ile Ser Cys Arg Ala Ser Glu Ser Val Asp Ser Tyr  
20 25 30

Gly His Ser Phe Met Gln Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro  
35 40 45

Lys Leu Leu Ile Tyr Arg Ala Ser Asn Leu Glu Pro Gly Ile Pro Ala  
50 55 60

Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Asn  
65 70 75 80

Pro Val Glu Ala Asp Asp Val Ala Thr Tyr Tyr Cys Gln Gln Trp Ser  
85 90 95

Ser Tyr Pro Leu Thr Phe Gly Ser Gly Thr Lys Leu Glu Leu Lys Arg  
100 105 110

<210> 85  
<211> 107  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody

<400> 85

Asp Ile Glu Leu Thr Gln Ser Pro Ala Ile Met Ser Ala Ser Pro Gly  
1 5 10 15

Glu Lys Val Thr Thr Thr Cys Ser Ala Ser Ser Ser Val Ser Tyr Met  
 20 25 30

Gly Trp Phe Gln Gln Lys Pro Gly Thr Ser Pro Lys Leu Trp Ile Tyr  
 35 40 45

Ser Thr Ser Asn Leu Ala Ser Gly Val Pro Ala Arg Phe Ser Gly Ser  
 50 55 60

Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile Ser Arg Met Glu Ala Glu  
 65 70 75 80

Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Ser Asn Glu Asp Pro Pro Thr  
 85 90 95

Phe Gly Ser Gly Asp Gln Ala Gly Asn Lys Ser  
 100 105

<210> 86  
 <211> 112  
 <212> PRT  
 <213> Artificial

<220>  
 <223> single chain antibody

<400> 86

Asp Ile Glu Leu Thr Gln Ser Pro Ala Ile Met Ser Ala Ser Pro Gly  
 1 5 10 15

Glu Lys Val Thr Thr Thr Cys Arg Ala Ser Glu Ser Val Asp Ser Tyr  
 20 25 30

Gly His Ser Phe Met Gln Trp Phe Gln Gln Lys Pro Gly Thr Ser Pro  
 35 40 45

Lys Leu Trp Ile Tyr Ser Thr Ser Asn Leu Ala Ser Gly Val Pro Ala  
 50 55 60

Arg Phe Ser Gly Ser Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile Ser  
 65 70 75 80

Arg Met Glu Ala Glu Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Ser Asn  
 85 90 95

Glu Asp Pro Tyr Thr Phe Gly Ser Gly Asp Gln Ala Gly Asn Lys Arg  
100 105 110

<210> 87  
<211> 107  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody

<400> 87

Asp Thr Glu Leu Thr Gln Ser Pro Ala Ile Met Ser Ala Ser Pro Gly  
1 5 10 15

Glu Lys Val Thr Thr Thr Cys Ser Ala Ser Ser Ser Val Ser Tyr Met  
20 25 30

Tyr Trp Tyr Gln Gln Lys Pro Gly Ser Ser Pro Arg Leu Leu Ile Tyr  
35 40 45

Asp Thr Ser Asn Leu Ala Ser Gly Val Pro Val Arg Phe Ser Gly Ser  
50 55 60

Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile Ser Arg Met Glu Ala Glu  
65 70 75 80

Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Trp Ser Ser Asn Pro Leu Thr  
85 90 95

Phe Gly Ser Gly Thr Lys Leu Glu Leu Lys Arg  
100 105

<210> 88  
<211> 109  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody

<400> 88

Asp Ile Glu Leu Thr Gln Ser Pro Ala Ile Met Ser Ala Ser Pro Gly  
1 5 10 15

Glu Lys Val Thr Thr Thr Cys Arg Ala Ser Ser Ser Val Ser Ser Ser  
20 25 30

Tyr Leu Gly Trp Tyr Gln Gln Lys Pro Gly Ser Ser Pro Arg Leu Leu  
35 40 45

Ile Tyr Asp Thr Ser Asn Leu Ala Ser Gly Val Pro Val Arg Phe Ser  
50 55 60

Gly Ser Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile Ser Arg Met Glu  
65 70 75 80

Ala Glu Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Trp Ser Ser Asn Pro  
85 90 95

Leu Thr Phe Gly Ser Gly Thr Lys Leu Glu Leu Lys Arg  
100 105

<210> 89  
<211> 109  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody

<400> 89

Asp Ser Glu Leu Thr Gln Ser Pro Thr Thr Met Ala Ala Ser Pro Gly  
1 5 10 15

Glu Lys Ile Thr Thr Thr Cys Ser Ala Ser Ser Ser Ile Ser Ser Asn  
20 25 30

Tyr Leu His Trp Tyr Gln Gln Arg Pro Gly Phe Ser Pro Lys Leu Leu  
35 40 45

Ile Tyr Arg Thr Ser Asn Leu Ala Ser Gly Val Pro Ala Arg Phe Ser  
50 55 60

Gly Ser Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile Gly Thr Met Glu  
65 70 75 80

Ala Glu Asp Val Ala Thr Tyr Tyr Cys Gln Gln Gly Ser Ser Ile Pro  
85 90 95



Arg Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys Arg  
100 105

<210> 90  
<211> 111  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody

<400> 90

Asp Ile Glu Leu Thr Gln Ser Pro Ala Ser Leu Ala Val Ser Leu Gly  
1 5 10 15

Arg Arg Ala Thr Thr Ser Cys Arg Ala Ser Glu Ser Val Glu Tyr Tyr  
20 25 30

Gly Thr Ser Leu Met Gln Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro  
35 40 45

Lys Leu Leu Ile Tyr Ala Ala Ser Asn Val Glu Ser Gly Val Pro Ala  
50 55 60

Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Ser Leu Asn Ile His  
65 70 75 80

Pro Val Glu Glu Asp Ile Ala Met Tyr Phe Cys Gln Gln Ser Arg Lys  
85 90 95

Val Pro Trp Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys Arg  
100 105 110

<210> 91  
<211> 112  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody

<400> 91

Tyr Ile Glu Leu Thr Gln Ser Pro Ala Ser Leu Ala Val Ser Leu Gly  
1 5 10 15

Gln Arg Ala Thr Thr Ser Cys Arg Ala Ser Glu Ser Val Asp Ser Tyr  
20 25 30

Gly Asn Ser Phe Met His Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro  
35 40 45

Lys Leu Leu Ile Tyr Leu Ala Ser Asn Leu Glu Ser Gly Val Pro Ala  
50 55 60

Arg Phe Ser Gly Ser Gly Ser Arg Thr Asp Phe Thr Leu Thr Ile Asp  
65 70 75 80

Pro Val Glu Ala Asp Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Asn Asn  
85 90 95

Glu Asp Pro Tyr Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys Ser  
100 105 110

<210> 92  
<211> 112  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody

<400> 92

Asp Ile Glu Leu Thr Gln Ser Pro Ala Ser Leu Ala Val Ser Leu Gly  
1 5 10 15

Gln Arg Ala Thr Thr Ser Cys Arg Ala Ser Glu Ser Val Glu Tyr Tyr  
20 25 30

Gly Thr Ser Leu Met Gln Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro  
35 40 45

Lys Leu Leu Ile Tyr Ala Ala Ser Asn Val Glu Ser Gly Ala Pro Ala  
50 55 60

Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Ser Leu Asn Ile His  
65 70 75 80

Pro Val Glu Glu Asp Asp Ile Ala Met Tyr Phe Cys Gln Gln Ser Arg  
85 90 95

Lys Val Pro Tyr Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys Arg  
100 105 110

<210> 93  
<211> 109  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody

<400> 93

Asp Ile Glu Leu Thr Gln Ser Pro Ala Ile Met Ser Ala Ser Pro Gly  
1 5 10 15

Glu Lys Val Thr Thr Thr Cys Ser Val Ser Ser Ser Ile Ser Ser Ser  
20 25 30

Asn Leu His Trp Tyr Gln Gln Lys Ser Gly Thr Ser Pro Lys Leu Trp  
35 40 45

Ile Tyr Gly Thr Ser Asn Leu Ala Ser Gly Val Pro Val Arg Phe Ser  
50 55 60

Gly Ser Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile Ser Ser Met Glu  
65 70 75 80

Ala Glu Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Trp Ser Ser Tyr Pro  
85 90 95

Leu Thr Phe Gly Ala Gly Thr Lys Val Glu Leu Arg Arg  
100 105

<210> 94  
<211> 109  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody

<400> 94

Asp Ile Glu Leu Thr Gln Ser Pro Ala Ser Met Ser Ala Ser Pro Gly  
1 5 10 15

Glu Lys Val Thr Met Thr Cys Arg Ala Thr Ser Ser Val Ser Ser Ser  
20 25 30

Tyr Leu His Trp Tyr Gln Gln Lys Ser Gly Ala Ser Pro Lys Leu Trp  
35 40 45

Ile Tyr Ser Ala Ser Asn Leu Ala Ser Gly Val Pro Ser Arg Phe Ser  
50 55 60

Gly Ser Gly Ser Gly Thr Ser Tyr Leu Ser Thr Ile Ser Ser Val Glu  
65 70 75 80

Ala Glu Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Tyr Ile Gly Tyr Pro  
85 90 95

Tyr Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys Arg  
100 105

<210> 95  
<211> 109  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody

<400> 95

Asp Ile Glu Leu Thr Gln Ser Pro Thr Thr Met Ala Ala Ser Pro Gly  
1 5 10 15

Glu Lys Ile Thr Ile Thr Cys Ser Ala Ser Ser Ser Ile Gly Ser Asn  
20 25 30

Tyr Leu His Trp Tyr Gln Gln Lys Pro Gly Phe Ser Pro Lys Leu Leu  
35 40 45

Ile Tyr Lys Thr Ser Asn Leu Ala Ser Gly Val Pro Ala Arg Phe Ser  
50 55 60

Gly Ser Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile Gly Ala Val Glu  
65 70 75 80

Ala Glu Asp Val Ala Thr Tyr Tyr Cys Gln Gln Gly Ser Ser Ile Pro  
85 90 95

Tyr Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys Arg  
100 105

<210> 96  
<211> 36  
<212> DNA  
<213> Artificial

<220>  
<223> oligonucleotide primer

<400> 96  
gtctcctgag ctagctgagg agacggtgac cgtggt 36

<210> 97  
<211> 42  
<212> DNA  
<213> Artificial

<220>  
<223> oligonucleotide primer

<400> 97  
gtaccaacgc gtgtcttgtc ccaggtccag ctgcaggagt ct 42

<210> 98  
<211> 42  
<212> DNA  
<213> Artificial

<220>  
<223> oligonucleotide primer

<400> 98  
gtaccaacgc gtgtcttgtc ccaggtgaag ctgcagcagt ca 42

<210> 99  
<211> 42  
<212> DNA  
<213> Artificial

<220>  
<223> oligonucleotide primer

<400> 99  
gtaccaacgc gtgtcttgtc ccaggtgcag ctggtgcagt ct 42

<210> 100  
<211> 54  
<212> DNA  
<213> Artificial

<220>  
 <223> oligonucleotide primer  
  
 <400> 100  
 tcagtcggtg catgtactcc aggtgcacga tgtgacatcg agtcactca gtct 54  
  
 <210> 101  
 <211> 36  
 <212> DNA  
 <213> Artificial  
  
 <220>  
 <223> oligonucleotide primer  
  
 <400> 101  
 ctggaaatca aacgtacgtt ttatttccag cttggt 36  
  
 <210> 102  
 <211> 54  
 <212> DNA  
 <213> Artificial  
  
 <220>  
 <223> oligonucleotide primer  
  
 <400> 102  
 tcagtcggtg catgtactcc aggtgcacga tgtgacatcg agtcactca gtct 54  
  
 <210> 103  
 <211> 36  
 <212> DNA  
 <213> Artificial  
  
 <220>  
 <223> oligonucleotide primer  
  
 <400> 103  
 ctggaaatca aacgtacgtt tgatttccag cttggt 36  
  
 <210> 104  
 <211> 54  
 <212> DNA  
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Gly Arg Gly Val Asn  
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<220>  
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<400> 107

Asn Gly Asp Pro Glu Ala Phe Asp Tyr  
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<210> 108  
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<400> 108

Ala Leu Gln Ser Asp Ser Pro Tyr Phe Asp  
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<211> 10  
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<400> 109

Asp Leu Ala Ile Phe Ala Gly Asn Asp Tyr  
1 5 10

<210> 110  
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<220>  
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<400> 110

Val Gly Val Asp Arg Trp Tyr Pro Ala Asp Tyr  
1 5 10

<210> 111  
<211> 12  
<212> PRT  
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<220>  
<223> single chain antibody fragment

<400> 111

Asp Leu Leu Asp Gly Ser Gly Ala Tyr Phe Asp Tyr  
1 5 10

<210> 112  
<211> 13  
<212> PRT  
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<220>  
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<400> 112

Asp Leu Asp Tyr Gly Gly Asn Ala Gly Tyr Phe Asp Leu  
1 5 10

<210> 113  
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<212> PRT  
<213> Artificial



<220>

<223> single chain antibody fragment

<400> 113

Asp Leu Asp Tyr Gly Gly Asn Ala Gly Tyr Phe Asp Leu  
1 5 10

<210> 114

<211> 13

<212> PRT

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<220>

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<400> 114

Asp Tyr Thr Ala Asn Tyr Tyr Tyr Tyr Gly Met Asp Val  
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<210> 115

<211> 15

<212> PRT

<213> Artificial

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<400> 115

Asp Leu Gly Tyr Gly Ser Gly Thr Ser Ser Tyr Tyr Leu Asp Tyr  
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<210> 116

<211> 9

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<220>

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<400> 116

Gln Gln Ala Asn Ser Phe Pro Arg Thr  
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<210> 117

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<400> 117

Leu Gln Asp Tyr Asn Gly Trp Thr  
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<210> 118

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<400> 118

Asn Ser Arg Asp Ser Ser Gly Asn His Val Val  
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<213> Artificial

<220>

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<400> 119

Lys Ser Arg Asp Ser Arg Gly Asn His Leu Ala Leu  
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<400> 120

Gln Gln Tyr His Thr Ile Ser Arg Thr  
1 5

<210> 121

<211> 11

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<213> Artificial

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<400> 121

Asn Ser Arg Asp Ser Ser Gly Asn His Val Val  
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<210> 122

<211> 11

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<213> Artificial

<220>

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<400> 122

His Ser Arg Asp Ser Ser Val Thr Asn Leu Asp  
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<210> 123

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<213> Artificial

<220>

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<400> 123

Asn Ser Arg Asp Ser Ser Gly Asn His Gln Val  
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<210> 124

<211> 9

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<220>

<223> single chain antibody fragment

<400> 124

Asn Ser Arg Asp Ser Ser Gly Val Val  
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<400> 125

Asn Ser Arg Asp Ser Ser Gly Asn His Val Val  
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<210> 126

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<400> 126

Leu Ala Thr Tyr Tyr Tyr Phe Gly Leu Asp Val  
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<223> single chain antibody fragment

<400> 127

Leu Ala Thr Tyr Tyr Tyr Phe Gly Leu Asp Val  
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<213> Artificial

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<223> single chain antibody fragment

<400> 128

Gly Pro Trp Glu Leu Val Gly Tyr Phe Asp Ser  
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<210> 129

<211> 15

<212> PRT

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<220>

<223> single chain antibody fragment

<400> 129

Glu Pro Asp Trp Leu Leu Trp Gly Asp Arg Gly Ala Leu Asp Val  
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<210> 130  
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<400> 130

Glu Pro Asp Trp Leu Leu Trp Gly Asp Arg Gly Ala Leu Asp Val  
1 5 10 15

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<220>  
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<400> 131

Glu Pro Asp Trp Leu Leu Trp Gly Asp Arg Gly Ala Leu Asp Val  
1 5 10 15

<210> 132  
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<212> PRT  
<213> Artificial

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<400> 132

Gln Gln Tyr Asn Ser Tyr Val Tyr Thr  
1 5

<210> 133  
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<400> 133

Gln Gln Leu Asn Ser Tyr Pro Leu Thr  
1 5

<210> 134  
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<400> 134

Gln Gln Leu Ile Ser Tyr Pro Leu Thr  
1 5

<210> 135  
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<400> 135

Gln His Tyr Asn Thr Tyr Pro Tyr Thr  
1 5

<210> 136  
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<220>  
<223> single chain antibody fragment

<400> 136

Gln His Tyr Asn Thr Tyr Pro Tyr Thr  
1 5

<210> 137  
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<212> PRT  
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<220>  
<223> single chain antibody fragment

<400> 137

Gln His Tyr Asn Thr Tyr Pro Tyr Thr

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5

<210> 138  
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<220>  
<223> single chain antibody fragment

<400> 138

Gln Val Gln Leu Gln Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly  
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser  
20 25 30

<210> 139  
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<220>  
<223> single chain antibody fragment

<400> 139

Asp Tyr Tyr Met Tyr  
1 5

<210> 140  
<211> 14  
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<400> 140

Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val Ala  
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<211> 17  
<212> PRT  
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<220>  
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<400> 141

Thr Ile Ser Asp Gly Gly Ser Tyr Thr Tyr Tyr Pro Asp Ser Val Lys  
1 5 10 15

Gly

<210> 142

<211> 30

<212> PRT

<213> Artificial

<220>

<223> single chain antibody fragment

<400> 142

Gln Val Gln Leu Gln Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly  
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser  
20 25 30

<210> 143

<211> 5

<212> PRT

<213> Artificial

<220>

<223> single chain antibody fragment

<400> 143

Asp Tyr Tyr Met Tyr  
1 5

<210> 144

<211> 14

<212> PRT

<213> Artificial

<220>

<223> single chain antibody fragment

<400> 144

Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val Ala  
1 5 10

<210> 145



<211> 17  
<212> PRT  
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<220>  
<223> single chain antibody fragment

<400> 145

Thr	Ile	Ser	Asp	Gly	Gly	Ser	Tyr	Thr	Tyr	Tyr	Pro	Asp	Ser	Val	Lys
1				5					10					15	

Gly

<210> 146  
<211> 30  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 146

Gln	Val	Gln	Leu	Gln	Glu	Ser	Gly	Gly	Gly	Leu	Val	Gln	Pro	Gly	Gly
1			5						10					15	

Ser	Leu	Arg	Leu	Ser	Cys	Ala	Ala	Ser	Gly	Phe	Thr	Phe	Ser
			20					25					30

<210> 147  
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<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 147

Asp	His	Tyr	Met	Tyr
1			5	

<210> 148  
<211> 14  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 148

Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val Ala  
1 5 10

<210> 149

<211> 17

<212> PRT

<213> Artificial

<220>

<223> single chain antibody fragment

<400> 149

Thr Ile Ser Asp Gly Gly Ser Tyr Thr Tyr Tyr Pro Asp Ser Val Lys  
1 5 10 15

Gly

<210> 150

<211> 30

<212> PRT

<213> Artificial

<220>

<223> single chain antibody fragment

<400> 150

Gln Val Gln Leu Gln Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly  
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Ser Ser  
20 25 30

<210> 151

<211> 5

<212> PRT

<213> Artificial

<220>

<223> single chain antibody fragment

<400> 151

Asp His Tyr Met Tyr  
1 5

<210> 152

<211> 14  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 152

Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val Ala  
1 5 10

<210> 153  
<211> 17  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 153

Thr Ile Ser Asp Gly Gly Ser Tyr Thr Tyr Tyr Pro Asp Ser Val Lys  
1 5 10 15

Gly

<210> 154  
<211> 30  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 154

Gln Val Gln Leu Gln Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly  
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Ser Ser  
20 25 30

<210> 155  
<211> 5  
<212> PRT  
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<220>  
<223> single chain antibody fragment

<400> 155

Asp His Tyr Met Tyr  
1 5

<210> 156

<211> 14

<212> PRT

<213> Artificial

<220>

<223> single chain antibody fragment

<400> 156

Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val Ala  
1 5 10

<210> 157

<211> 17

<212> PRT

<213> Artificial

<220>

<223> single chain antibody fragment

<400> 157

Thr Ile Ser Asp Gly Gly Ser Tyr Thr Tyr Tyr Pro Asp Ser Val Lys  
1 5 10 15

Gly

<210> 158

<211> 30

<212> PRT

<213> Artificial

<220>

<223> single chain antibody fragment

<400> 158

Gln Val Gln Leu Val Gln Ser Gly Gly Gly Val Val His Pro Gly Arg  
1 5 10 15

Ser Leu Lys Leu Ser Cys Ala Gly Ser Gly Phe Thr Phe Ser  
20 25 30

<210> 159

<211> 5  
<212> PRT  
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<220>  
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<400> 159

Asp Tyr Asp Met His  
1 5

<210> 160  
<211> 14  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 160

Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val Ala  
1 5 10

<210> 161  
<211> 17  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 161

Val Met Trp Phe Asp Gly Thr Glu Lys Tyr Ser Ala Glu Ser Val Lys  
1 5 10 15

Gly

<210> 162  
<211> 30  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 162

Gln Val Gln Leu Val Gln Ser Gly Gly Gly Val Val His Pro Gly Arg  
1 5 10 15

Ser Leu Lys Leu Ser Cys Ala Gly Ser Gly Phe Thr Phe Ser  
20 25 30

<210> 163  
<211> 5  
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<220>  
<223> single chain antibody fragment

<400> 163

Asp Tyr Asp Met His  
1 5

<210> 164  
<211> 14  
<212> PRT  
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<220>  
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<400> 164

Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val Ala  
1 5 10

<210> 165  
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<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 165

Val Met Trp Phe Asp Gly Thr Glu Lys Tyr Ser Ala Glu Ser Val Lys  
1 5 10 15

Gly

<210> 166  
<211> 30  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 166

Gln Val Gln Leu Val Gln Ser Gly Gly Gly Val Val His Pro Gly Arg  
1 5 10 15

Ser Leu Lys Leu Ser Cys Ala Gly Ser Gly Phe Thr Phe Ser  
20 25 30

<210> 167  
<211> 5  
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<220>  
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<400> 167

Asp Tyr Asp Met His  
1 5

<210> 168  
<211> 14  
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<220>  
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<400> 168

Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val Ala  
1 5 10

<210> 169  
<211> 17  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 169

Val Ile Trp Phe Asp Gly Thr Glu Lys Tyr Ser Ala Glu Ser Val Lys  
1 5 10 15

Gly

<210> 170  
<211> 30  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 170

Gln Val Gln Leu Val Gln Ser Gly Gly Gly Val Val His Pro Gly Arg  
1 5 10 15

Ser Leu Lys Leu Ser Cys Ala Gly Ser Gly Phe Thr Phe Ser  
20 25 30

<210> 171  
<211> 5  
<212> PRT  
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<220>  
<223> single chain antibody fragment

<400> 171

Asp Tyr Asp Met His  
1 5

<210> 172  
<211> 14  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 172

Trp Val Arg Gln Ala Pro Gly Lys Gly Phe Glu Trp Val Ala  
1 5 10

<210> 173  
<211> 17  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 173



Val	Met	Trp	Phe	Asp	Gly	Thr	Glu	Lys	Tyr	Ser	Ala	Glu	Ser	Val	Lys
1				5					10					15	

Gly

<210> 174  
 <211> 30  
 <212> PRT  
 <213> Artificial

<220>  
 <223> single chain antibody fragment

<400> 174

Gln	Val	Gln	Leu	Gln	Gln	Ser	Gly	Gly	Gly	Leu	Val	Gln	Pro	Gly	Gly
1				5					10					15	

Ser	Leu	Arg	Leu	Ser	Cys	Ala	Ala	Ser	Gly	Phe	Thr	Phe	Ser
			20					25					30

<210> 175  
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 <212> PRT  
 <213> Artificial

<220>  
 <223> single chain antibody fragment

<400> 175

Asn	Tyr	Ala	Met	Thr
1			5	

<210> 176  
 <211> 14  
 <212> PRT  
 <213> Artificial

<220>  
 <223> single chain antibody fragment

<400> 176

Trp	Val	Arg	Gln	Ala	Pro	Gly	Lys	Gly	Leu	Glu	Trp	Val	Ser
1				5					10				

<210> 177  
 <211> 17

<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 177

Ser	Ile	Ser	Val	Gly	Gly	Ser	Asp	Thr	Tyr	Tyr	Ala	Asp	Ser	Val	Lys
1				5					10					15	

Gly

<210> 178  
<211> 32  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 178

Arg	Phe	Thr	Ile	Ser	Arg	Asp	Asn	Ser	Lys	Asn	Thr	Leu	Tyr	Leu	Gln
1				5					10					15	

Met	Asn	Ser	Leu	Arg	Ala	Glu	Asp	Thr	Ala	Met	Tyr	Tyr	Cys	Ser	Arg
			20					25					30		

<210> 179  
<211> 9  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 179

Tyr	Arg	Tyr	Asp	Asp	Ala	Met	Asp	Tyr
1				5				

<210> 180  
<211> 11  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 180

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser  
1 5 10

<210> 181  
<211> 32  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 181

Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr Leu Gln  
1 5 10 15

Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Ile Tyr Tyr Cys Ser Arg  
20 25 30

<210> 182  
<211> 9  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 182

Tyr Arg Tyr Asp Asp Ala Met Asp Tyr  
1 5

<210> 183  
<211> 11  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 183

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser  
1 5 10

<210> 184  
<211> 32  
<212> PRT  
<213> Artificial

<220>

<223> single chain antibody fragment

<400> 184

Arg Phe Thr Thr Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr Leu Gln  
1 5 10 15

Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Ile Tyr Tyr Cys Ser Arg  
20 25 30

<210> 185

<211> 9

<212> PRT

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<220>

<223> single chain antibody fragment

<400> 185

Tyr Arg Tyr Asp Asp Ala Met Asp Tyr  
1 5

<210> 186

<211> 11

<212> PRT

<213> Artificial

<220>

<223> single chain antibody fragment

<400> 186

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser  
1 5 10

<210> 187

<211> 32

<212> PRT

<213> Artificial

<220>

<223> single chain antibody fragment

<400> 187

Arg Phe Thr Val Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr Leu Gln  
1 5 10 15

Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Ile Tyr Tyr Cys Ser Arg  
20 25 30

<210> 188  
<211> 9  
<212> PRT  
<213> Artificial

<220>  
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<400> 188

Tyr Arg Tyr Asp Asp Ala Met Asp Tyr  
1 5

<210> 189  
<211> 11  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 189

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser  
1 5 10

<210> 190  
<211> 32  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 190

Arg Phe Thr Thr Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr Leu Gln  
1 5 10 15

Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Ile Tyr Tyr Cys Ser Arg  
20 25 30

<210> 191  
<211> 9  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 191

Tyr Arg Tyr Asp Asp Ala Met Asp Tyr  
1 5

<210> 192  
<211> 11  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 192

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser  
1 5 10

<210> 193  
<211> 32  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 193

Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Phe Leu Gln  
1 5 10 15

Met Asn Ser Leu Arg Ala Asp Asp Thr Ala Val Tyr Tyr Cys Ala Arg  
20 25 30

<210> 194  
<211> 15  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 194

Glu Pro Asp Trp Leu Leu Trp Gly Asp Arg Gly Ala Leu Asp Val  
1 5 10 15

<210> 195  
<211> 11  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 195

Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser  
1 5 10

<210> 196

<211> 32

<212> PRT

<213> Artificial

<220>

<223> single chain antibody fragment

<400> 196

Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Phe Leu Gln  
1 5 10 15

Met Asn Ser Leu Arg Ala Asp Asp Thr Ala Val Tyr Tyr Cys Ala Arg  
20 25 30

<210> 197

<211> 15

<212> PRT

<213> Artificial

<220>

<223> single chain antibody fragment

<400> 197

Glu Pro Asp Trp Leu Leu Trp Gly Asp Arg Gly Ala Leu Asp Val  
1 5 10 15

<210> 198

<211> 11

<212> PRT

<213> Artificial

<220>

<223> single chain antibody fragment

<400> 198

Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser  
1 5 10

<210> 199

<211> 32

<212> PRT

<213> Artificial

<220>

<223> single chain antibody fragment

<400> 199

Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Phe Leu Gln  
1 5 10 15

Met Asn Ser Leu Arg Ala Asp Asp Thr Ala Val Tyr Tyr Cys Ala Arg  
20 25 30

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<212> PRT

<213> Artificial

<220>

<223> single chain antibody fragment

<400> 200

Glu Pro Asp Trp Leu Leu Trp Gly Asp Arg Gly Ala Leu Asp Val  
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<210> 201

<211> 11

<212> PRT

<213> Artificial

<220>

<223> single chain antibody fragment

<400> 201

Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser  
1 5 10

<210> 202

<211> 32

<212> PRT

<213> Artificial

<220>

<223> single chain antibody fragment

<400> 202

Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Phe Leu Gln  
1 5 10 15

Met Asn Ser Leu Arg Ala Asp Asp Thr Ala Val Tyr Tyr Cys Ala Arg



20

25

30

<210> 203  
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<220>  
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<400> 203

Glu Pro Asp Arg Leu Leu Trp Gly Asp Arg Gly Ala Leu Asp Val  
 1 5 10 15

<210> 204  
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<220>  
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<400> 204

Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser  
 1 5 10

<210> 205  
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<220>  
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<400> 205

Arg Phe Thr Val Ser Arg Asp Asn Ser Lys Asn Thr Leu Leu Leu Gln  
 1 5 10 15

Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys Ala Lys  
 20 25 30

<210> 206  
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<220>  
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<400> 206

Val Arg Thr Lys Tyr Cys Ser Ser Leu Ser Cys Phe Ala Gly Phe Asp  
1 5 10 15

Ser

<210> 207

<211> 11

<212> PRT

<213> Artificial

<220>

<223> single chain antibody fragment

<400> 207

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser  
1 5 10

<210> 208

<211> 23

<212> PRT

<213> Artificial

<220>

<223> single chain antibody fragment

<400> 208

Glu Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro Gly  
1 5 10 15

Glu Arg Ala Thr Ile Ser Cys  
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<210> 209

<211> 15

<212> PRT

<213> Artificial

<220>

<223> single chain antibody fragment

<400> 209

Arg Ala Ser Glu Ser Val Asp Ser Tyr Gly His Ser Phe Met Gln  
1 5 10 15

<210> 210

<211> 15  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 210

Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile Tyr  
1 5 10 15

<210> 211  
<211> 7  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 211

Arg Ala Ser Asn Leu Glu Pro  
1 5

<210> 212  
<211> 23  
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<220>  
<223> single chain antibody fragment

<400> 212

Glu Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro Gly  
1 5 10 15

Glu Arg Ala Thr Ile Ser Cys  
20

<210> 213  
<211> 15  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 213

Arg Ala Ser Glu Ser Val Asp Ser Tyr Gly His Ser Phe Met Gln  
1 5 10 15

<210> 214  
<211> 15  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 214

Trp	Tyr	Gln	Gln	Lys	Pro	Gly	Gln	Ala	Pro	Arg	Leu	Leu	Ile	Tyr
1				5					10					15

<210> 215  
<211> 7  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 215

Arg	Ala	Ser	Asn	Leu	Glu	Pro
1				5		

<210> 216  
<211> 23  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 216

Glu	Ile	Val	Leu	Thr	Gln	Ser	Pro	Ala	Thr	Leu	Ser	Leu	Ser	Pro	Gly
1				5					10					15	

Glu	Arg	Ala	Thr	Ile	Ser	Cys
				20		

<210> 217  
<211> 15  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 217

Arg Ala Ser Glu Ser Val Asp Ser Tyr Gly His Ser Phe Met Gln  
 1 5 10 15

<210> 218  
 <211> 15  
 <212> PRT  
 <213> Artificial

<220>  
 <223> single chain antibody fragment

<400> 218

Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile Tyr  
 1 5 10 15

<210> 219  
 <211> 7  
 <212> PRT  
 <213> Artificial

<220>  
 <223> single chain antibody fragment

<400> 219

Arg Ala Ser Asn Leu Glu Pro  
 1 5

<210> 220  
 <211> 23  
 <212> PRT  
 <213> Artificial

<220>  
 <223> single chain antibody fragment

<400> 220

Glu Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro Gly  
 1 5 10 15

Glu Arg Ala Thr Ile Ser Cys  
 20

<210> 221  
 <211> 15  
 <212> PRT  
 <213> Artificial

<220>

<223> single chain antibody fragment

<400> 221

Arg	Ala	Ser	Glu	Ser	Val	Asp	Ser	Tyr	Gly	His	Ser	Phe	Met	Gln
1				5					10					15

<210> 222

<211> 15

<212> PRT

<213> Artificial

<220>

<223> single chain antibody fragment

<400> 222

Trp	Tyr	Gln	Gln	Lys	Pro	Gly	Gln	Ala	Pro	Arg	Leu	Leu	Ile	Tyr
1				5				10						15

<210> 223

<211> 7

<212> PRT

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<220>

<223> single chain antibody fragment

<400> 223

Arg	Ala	Ser	Asn	Leu	Glu	Pro
1			5			

<210> 224

<211> 23

<212> PRT

<213> Artificial

<220>

<223> single chain antibody fragment

<400> 224

Glu	Ile	Val	Leu	Thr	Gln	Ser	Pro	Ala	Thr	Leu	Ser	Leu	Ser	Pro	Gly
1				5					10						15

Glu	Arg	Ala	Thr	Ile	Ser	Cys
			20			

<210> 225

<211> 15

<212> PRT

<213> Artificial

<220>

<223> single chain antibody fragment

<400> 225

Arg	Ala	Ser	Glu	Ser	Val	Asp	Ser	Tyr	Gly	His	Ser	Phe	Met	Gln
1				5					10					15

<210> 226

<211> 15

<212> PRT

<213> Artificial

<220>

<223> single chain antibody fragment

<400> 226

Trp	Tyr	Gln	Gln	Lys	Pro	Gly	Gln	Ala	Pro	Arg	Leu	Leu	Ile	Tyr
1				5					10					15

<210> 227

<211> 7

<212> PRT

<213> Artificial

<220>

<223> single chain antibody fragment

<400> 227

Arg	Ala	Ser	Asn	Leu	Glu	Pro
1				5		

<210> 228

<211> 23

<212> PRT

<213> Artificial

<220>

<223> single chain antibody fragment

<400> 228

Asp	Ile	Val	Met	Thr	Gln	Ser	Pro	Ser	Thr	Leu	Ser	Ala	Ser	Val	Gly
1				5					10					15	

Asp	Arg	Val	Thr	Ile	Thr	Cys
				20		

<210> 229  
<211> 11  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 229

Arg Ala Ser Gln Ser Ile Ser Ser Trp Leu Ala  
1 5 10

<210> 230  
<211> 15  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 230

Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Met Tyr  
1 5 10 15

<210> 231  
<211> 7  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 231

Glu Ala Ser Ser Leu Glu Ser  
1 5

<210> 232  
<211> 23  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 232

Asp Ile Val Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly  
1 5 10 15

Asp Arg Val Thr Ile Thr Cys



<210> 233  
 <211> 11  
 <212> PRT  
 <213> Artificial

<220>  
 <223> single chain antibody fragment

<400> 233

Trp Ala Ser Gln Ser Ile Ser Ser Arg Leu Ala  
 1 5 10

<210> 234  
 <211> 15  
 <212> PRT  
 <213> Artificial

<220>  
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<400> 234

Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Met Tyr  
 1 5 10 15

<210> 235  
 <211> 7  
 <212> PRT  
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<220>  
 <223> single chain antibody fragment

<400> 235

Glu Ala Thr Ser Leu Gly Ser  
 1 5

<210> 236  
 <211> 23  
 <212> PRT  
 <213> Artificial

<220>  
 <223> single chain antibody fragment

<400> 236

Asp Ile Val Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly  
 1 5 10 15

Asp Arg Val Thr Ile Thr Cys  
20

<210> 237  
<211> 11  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 237

Arg Ala Ser Gln Ser Ile Ser Ser Trp Leu Ala  
1 5 10

<210> 238  
<211> 15  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 238

Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Met Tyr  
1 5 10 15

<210> 239  
<211> 7  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 239

Gly Ala Ser Ser Leu Gly Ser  
1 5

<210> 240  
<211> 23  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 240

Asp Ile Val Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly  
1 5 10 15

Asp Arg Val Thr Ile Thr Cys  
20

<210> 241  
<211> 11  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 241

Arg Ala Ser Gln Ser Ile Ser Ser Trp Leu Ala  
1 5 10

<210> 242  
<211> 15  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 242

Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Met Tyr  
1 5 10 15

<210> 243  
<211> 7  
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<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 243

Glu Ala Ser Ser Leu Gly Arg  
1 5

<210> 244  
<211> 23  
<212> PRT  
<213> Artificial

<220>

<223> single chain antibody fragment

<400> 244

Asp Ile Val Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly  
1 5 10 15

Asp Arg Val Thr Ile Thr Cys  
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<210> 245

<211> 11

<212> PRT

<213> Artificial

<220>

<223> single chain antibody fragment

<400> 245

Arg Ala Ser Gln Ser Ile Ser Ser Tyr Leu Asn  
1 5 10

<210> 246

<211> 15

<212> PRT

<213> Artificial

<220>

<223> single chain antibody fragment

<400> 246

Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile Tyr  
1 5 10 15

<210> 247

<211> 7

<212> PRT

<213> Artificial

<220>

<223> single chain antibody fragment

<400> 247

Ala Ala Ser Ser Leu Gln Ser  
1 5

<210> 248

<211> 32

<212> PRT

<213> Artificial

<220>

<223> single chain antibody fragment

<400> 248

Gly Ile Pro Ala Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr  
1 5 10 15

Leu Thr Ile Ser Ser Leu Glu Pro Glu Asp Phe Ala Val Tyr Tyr Cys  
20 25 30

<210> 249

<211> 9

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<220>

<223> single chain antibody fragment

<400> 249

Gln Gln Ser Asn Glu Asp Pro Phe Thr  
1 5

<210> 250

<211> 11

<212> PRT

<213> Artificial

<220>

<223> single chain antibody fragment

<400> 250

Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg  
1 5 10

<210> 251

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<223> single chain antibody fragment

<400> 251

Gly Ile Pro Ala Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr  
1 5 10 15

Leu Thr Ile Ser Ser Leu Glu Pro Glu Asp Phe Ala Val Tyr Tyr Cys  
20 25 30

<210> 252  
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<213> Artificial

<220>  
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<400> 252

Gln Gln Gly Asn Glu Val Pro Phe Thr  
1 5

<210> 253  
<211> 11  
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<220>  
<223> single chain antibody fragment

<400> 253

Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg  
1 5 10

<210> 254  
<211> 32  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 254

Gly Ile Pro Ala Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr  
1 5 10 15

Leu Thr Ile Ser Ser Leu Glu Pro Glu Asp Phe Ala Val Tyr Tyr Cys  
20 25 30

<210> 255  
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<213> Artificial

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<400> 255

Gln Gln Gly Asn Glu Val Pro Phe Thr  
1 5

<210> 256

<211> 11

<212> PRT

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<223> single chain antibody fragment

<400> 256

Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg  
1 5 10

<210> 257

<211> 32

<212> PRT

<213> Artificial

<220>

<223> single chain antibody fragment

<400> 257

Gly Ile Pro Ala Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr  
1 5 10 15

Leu Thr Ile Ser Ser Leu Glu Pro Glu Asp Phe Ala Val Tyr Tyr Cys  
20 25 30

<210> 258

<211> 9

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<400> 258

Gln Gln Gly Asn Glu Val Pro Phe Thr  
1 5

<210> 259

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<212> PRT

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<400> 259

Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg  
1 5 10

<210> 260

<211> 32

<212> PRT

<213> Artificial

<220>

<223> single chain antibody fragment

<400> 260

Gly Ile Pro Ala Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr  
1 5 10 15

Leu Thr Ile Ser Ser Leu Glu Pro Glu Asp Phe Ala Val Tyr Tyr Cys  
20 25 30

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<211> 9

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<223> single chain antibody fragment

<400> 261

Gln Gln Gly Asn Glu Val Pro Phe Thr  
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<400> 262

Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg  
1 5 10

<210> 263



<211> 32  
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<220>  
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<400> 263

Gly Val Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Glu Phe Thr  
1 5 10 15

Leu Thr Ile Ser Ser Leu Gln Pro Asp Asp Phe Ala Ala Tyr Tyr Cys  
20 25 30

<210> 264  
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<220>  
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<400> 264

Gln His Tyr Asn Thr Tyr Pro Tyr Thr  
1 5

<210> 265  
<211> 11  
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<400> 265

Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg  
1 5 10

<210> 266  
<211> 32  
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<213> Artificial

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<400> 266

Gly Val Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Glu Phe Thr  
1 5 10 15

Leu Thr Ile Ser Ser Leu Gln Pro Asp Asp Phe Ala Ala Tyr Tyr Cys  
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<210> 267  
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<220>  
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<400> 267

Gln His Tyr Asp Thr Tyr Pro Tyr Thr  
 1 5

<210> 268  
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<400> 268

Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg  
 1 5 10

<210> 269  
 <211> 32  
 <212> PRT  
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<220>  
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<400> 269

Gly Val Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Glu Phe Thr  
 1 5 10 15

Leu Thr Ile Ser Ser Leu His Pro Asp Asp Phe Ala Ala Tyr Tyr Cys  
 20 25 30

<210> 270  
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<220>  
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<400> 270

Gln His Tyr Asn Thr Tyr Pro Tyr Thr  
1 5

<210> 271  
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<400> 271

Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg  
1 5 10

<210> 272  
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<400> 272

Gly Val Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Glu Phe Thr  
1 5 10 15

Leu Thr Ile Ser Ser Leu Gln Pro Asp Asp Phe Ala Ala Tyr Tyr Cys  
20 25 30

<210> 273  
<211> 9  
<212> PRT  
<213> Artificial

<220>  
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<400> 273

Gln His Tyr Ser Thr Tyr Pro Tyr Thr  
1 5

<210> 274  
<211> 11

<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 274

Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg  
1 5 10

<210> 275  
<211> 32  
<212> PRT  
<213> Artificial

<220>  
<223> single chain antibody fragment

<400> 275

Gly Val Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr  
1 5 10 15

Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys  
20 25 30

<210> 276  
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<212> PRT  
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<220>  
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<400> 276

Gln Gln Ser Tyr Ser Thr Pro Arg Thr Thr  
1 5 10

<210> 277  
<211> 11  
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<400> 277

Phe Gly Gly Gly Thr Lys Val Asp Ile Lys Arg  
1 5 10

<210> 278  
<211> 7  
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<400> 278

Gly Gly Gly Gly Ser Ser Ser '  
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